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Numerical modeling of transients in the solar modulation of astroparticles

Tuesday, 5 December 2017 13:30 (30 minutes)

A three-dimensional (3D), time-dependent numerical model for the solar modulation of astroparticles (cosmic rays) is constructed based on solving the relevant transport equation applicable to the heliosphere which is the electrodynamic influence sphere of the Sun. The model is using the Stochastic Differential Equation (SDE) approach which provides numerical advantages. The model is designed to simulate transient events which originate from the Sun and propagate outwards with the solar wind to produce sharp and relative short term decrease, called Forbush Decreases (FDs), in the intensity of astroparticles. These charged particles with energies above 1 MeV arrive at the Earth from Galactic space (cosmos). In order to study the main features of these FDs, a complicated diffusion barrier must be constructed taking into account all relevant physics, such as convection, diffusion, adiabatic energy losses and particle drifts. The model and results will be discussed.

HPC content

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